REMARKS

Claims 1-19, 21-27 and 29-34 are pending in the present Application. By the present amendment, claims 1, 12, and 22 are amended to add the limitations of claim 8 and the cooling range set forth in claim 25 and claims 25, 32, and 33 are amended to add the limitation that the cooling is to occur in the sample probe.

The Applicant respectfully requests that this Amendment be entered and that the present application be reconsidered in light of the foregoing claim amendments and the following remarks.

I. EXAMINER INTERVIEW

On October 18, 2005, the undersigned, along with Harry Laxton (also of Hunton & Williams) had a telephone interview with Examiner Arlen Soderquist (Examiner) regarding the Office Action issued July 21, 2005. The Applicant appreciates the courtesy and assistance extended by the Examiner during this interview.

The specific purpose of the interview was to discuss the Examiner's use of a 1976 article by Heyman and Turner ("Heyman Paper") in combination with a Japanese article by Yokoyama et al. (Yokoyama Paper) to construct an obviousness rejection. Prior to the interview, the undersigned had forwarded a copy of page 2 of the Yokoyama Paper with a penciled-in translation of the terms used in Figures 1 and 2. A copy of this page is enclosed as Attachment 1 to this Response.

In the interview, the undersigned pointed out that the Examiner had cited Yokoyama as suggesting that a converter placed "at the sampling point" would require heating. The Examiner's assertion was based on the apparent use of heated lines in the systems depicted in Figures 1 and 2 of the Yokoyama Paper. The translation of these figures (see Attachment 1) indicates that neither figure depicts an actual emission sampling system. The systems shown in these figures are, instead, merely systems for testing the disclosed methods and the converter set-up. The undersigned asserted that the heating of the lines appears to be for the purpose of heating the gas to temperatures that would be similar to what would be experienced with a

sample gas. Based on this information, the Examiner stated that that he would need to get a full English translation of the Yokoyama Paper for any further examination.

The interview then focused on method claim 25, which recites cooling the gas to a temperature below 350 degrees Fahrenheit and above the dew point of the gas. In the Office Action, the Examiner stated that it would be "inherent in the Heyman system [that there] would be a loss of heat when the temperature of the gasses contact an environment at a temperature lower than their own temperature." The undersigned pointed out that there is nothing in Heyman that talks about establishing a particular temperature range of the gas coming out of the sampling probe.

As noted in the Interview Summary dated October 18, 2005, the Examiner agreed that claim 25 would be allowable over the prior art of record if it was amended to state that the cooling step is carried out in the sampling probe and that similar allowability would be attained by amending all other independent method and system claims. The Examiner stated that this would be sufficient to allow entry of an amendment after final but that the claims would still be subject to additional search.

As also noted in the Interview Summary, the Examiner agreed to enter the amendment described above and to obtain a full translation of the Yokoyama Paper.

II. THE CLAIMS ARE PATENTABLE OVER THE CITED ART

In paragraph 2 of the Office Action, claims 1-19, 21-27, and 29-34 (all pending claims) were rejected under 35 U.S.C. 103(a) as being assertedly unpatentable over the Heyman Paper in view of the Yokoyama Paper, a paper by R.D. Jacquot et al. ("Jacquot Paper"), Burrows, U.S. Patent No. 5,739,038 (Burrows Patent") and Yamaki et al., U.S. Patent No. 4,073,866 ("Yamaki Patent") or Hara et al, Japanese App. No. 53-37591 ("Hara Application"). The Applicants respectfully traverse this rejection.

1. Independent Claims 1, 12, 22 , 25, 32 and 33

Claims 1, 12, 22 , 25, 32 and 33 have all been amended according to the Examiner's suggestion regarding the additional recitation that cooling is carried out in the sampling probe.

The Applicants respectfully submit that the combined teachings of the cited prior art references do not teach, disclose or suggest the features of independent claims 1, 12, 22 , 25, 32 and 33, as amended. Specifically, there is no disclosure or suggestion of systems as recited in claims 1, 12 and 22 having the arrangement of components recited and having a sampling device comprising a sample probe that includes means for cooling the sample gas in the sample probe to a temperature below about 350 °F but above a dew point temperature of the sample gas. Further, there is no disclosure or suggestion of methods as recited in claims 25, 32 and 33 that include the recited steps including cooling the sample gas in the sample probe to a temperature below about 350 °F but above a dew point temperature of the sample gas.

For at least the above reasons, the Applicants respectfully submit that the rejection of claims 1, 12, 22 , 25, 32 and 33 under 35 U.S.C. 103(b) should be withdrawn.

2. Dependent Claims 2-11, 13-19, 21, 23, 24, 26, 27 and 29-31

Each of claims 2-11, 13-19, 21, 23, 24, 26, 27 and 29 is dependent on one of the independent claims discussed above. Because each of those independent claims is patentable over the cited combination of references, the Applicants submit that the dependent claims are also patentable. Accordingly, the Applicants respectfully submit that the rejection of claims 2-11, 13-19, 21, 23, 24, 26, 27 and 29-31 under 35 U.S.C. 103(b) should also be withdrawn

III. CONCLUSION

The Applicants have amended the claims in accordance with the Examiner's suggestions. For the reasons set forth above and in the Examiner's Interview Summary, the Applicants respectfully submit that claims 1-19, 21-27 and 29-34 are in condition for allowance. The Applicants therefore request that the present Amendment be entered and that the application be allowed and passed to issue.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact the Applicants' undersigned representative.

Respectfully submitted,

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2. 除湿器を通したのち分析計へ導入した場合
3. 水中へバブリングして除湿器を通したのち分析計へ導入した場合

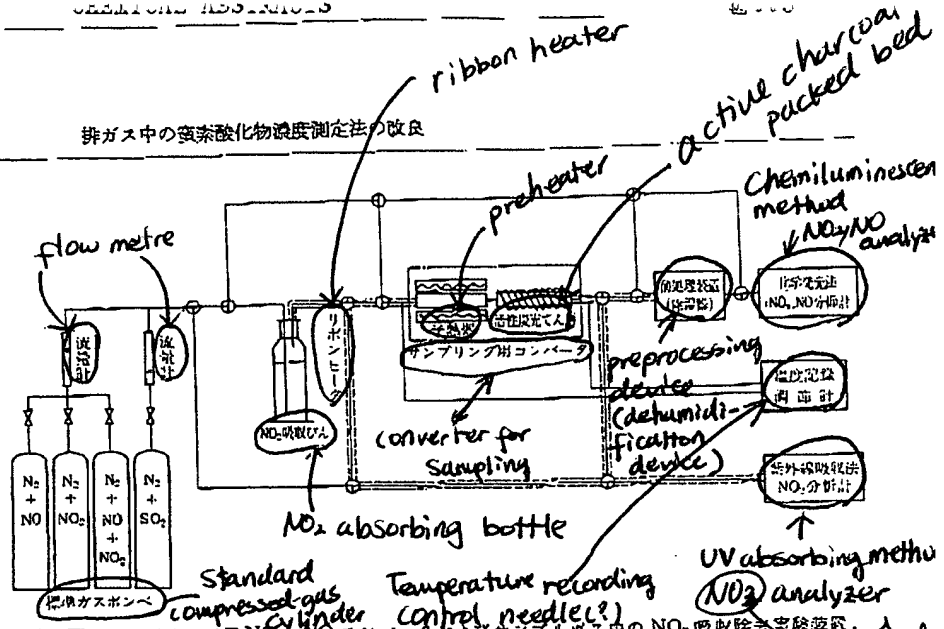
の測定値を比較した.

2.2 サンプリング用コンバータ

高温における NO_2 が NO へ分解する過程を調べるため, 外部をリボンヒータで加熱したガラス管に NO_2 を流す簡単な定性実験を行なった. その結果, NO_2 は NO へ分解しやすく, ガラス管中にボイラ排ガス中のカーボンまたは活性炭を充てんした場合にはさらに多くの NO_2 が NO に分解した. これらの結果をもとに活性炭を使用したサンプリング用 NO_2→NO コンバータを試作（第1図）し, 性能試験を行なった. コンバータはステンレス製で, 電気加熱炉による予熱部とシーズヒータを巻いた活性炭充てん層からなっている.

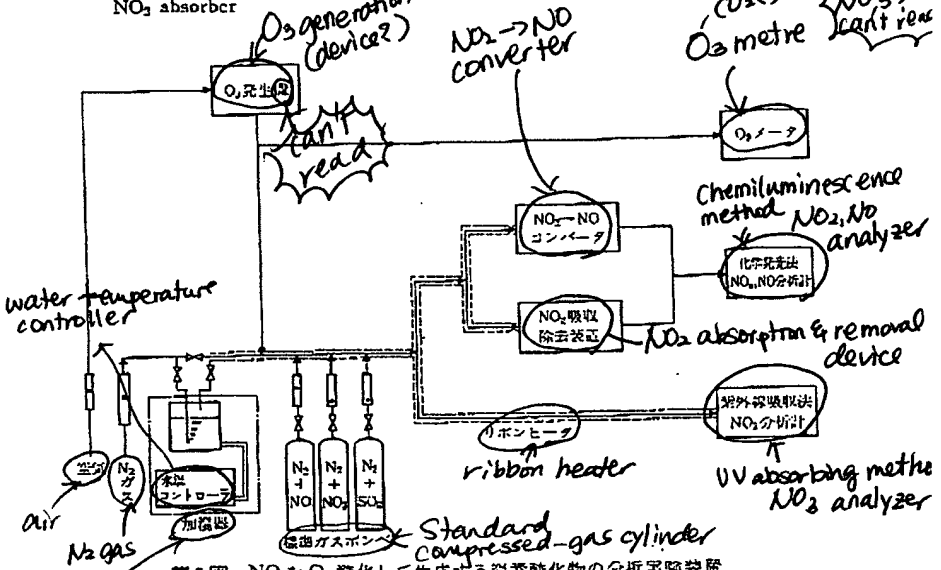
2.3 サンプルガス中の NO_2 の吸収除去

サンプルガス中の NO または NO_2 を別個に測定するには, まずサンプリング用コンバータにより正確な NO_x 値（$NO+NO_2$ とする）を求め, NO, NO_2 のいずれか一方の値が求まれば他の値も求められる. ゆえに, いずれか一方のみを吸収する液にサンプルガスを通したのち分析する方法を採用した. しかし, NO のみを吸収する吸収剤は実験した範囲では見つからなかったので, NO は吸収せず NO_2 のみをよく吸収する吸収液の探索を中心に実験した. 実験は, 吸収剤のほか液の pH, ガス流量, 吸収びんの容量, 液量, 液深さ, ガス出口ノズルの形状などを変えて行なった.



第1図 サンプリング用 NO_2→NO コンバータおよびサンプルガス中の NO_2 吸収除去実験装置

Fig. 1 Schematic flow diagram of an apparatus for testing NO_2→NO converter and NO_2 absorber



第2図 NO を O_3 酸化して生成する窒素酸化物の分析実験装置

Fig. 2 Schematic flow diagram of an apparatus for determining nitrogen oxides formed by ozone oxidation of NO

2.4 NO の O_3 酸化により生成した NO_2 の分析

O_3 を酸化剤として NO を NO_2 にする脱硝プロセスのような場合には, NO_2 以上に酸化された窒素酸化物の生成（N_2O_5 など）が考えられる. そこで, このような場合, 分析方法への影響を調べるため O_3 発生機を使用（第2図）し, 化学発光法分析計と紫外線吸収式 NO_2 計を併用して NO_x, NO, NO_2 を測定した. さらに, 生成された NO, NO_2 以外の窒素酸化物の存在を調べるため, O_3/NO の種々の値のガスを吸収液に1時間吸収させたときの液中に存在するそれぞれの NO_3^- を, 文献[1]の改良法により分析した.

2.5 ボイラ排ガスに対する実用例

以上に述べた分析方法を実際のボイラ排ガスによる O_3 酸化法湿式脱硝法テストプラントに適用した. 煙道にサンプリング用 NO_2→NO コンバータと NO_2 吸収びんを並列に設置し, 化学発光法分析計により分析した場合, コンバークおよび吸収びんを用いず化学発光法分析計および紫外線吸収法 NO_2 計へテフロン管で直接導いて分析した場合, PDS 法による手分析の場合の結果を比較した.

3. 結果および考察

3.1 凝縮水分中への NO_2 の吸収と NO の発生

湿りガスの場合には, 途中のラインおよび除湿器において NO_2 はほぼ（1）式に従って吸収され, 吸収された NO_2 の約1/3の NO が発生することが確認された（第1表）. とくに, 除湿器での NO_2 の吸収が大きい. これは, 前処理装置が加圧・低温状態（0.2～1.2 kg f/cm², 2 °C）で操作されているので, NO_2 の水分中への吸収がより起りやすくなっているものと思われる. 圧力の影響が非常に大きいので, できるかぎり圧力を低く抑えるべきである.

NO_2 標準ガスを化学発光法分析計で直接分析した場合, いくぶん低い値となっているのは, 分析器内の NO_2→NO コンバークの転換効率が100％でないためと思われる. 一般に市販されている製品では, 転換効率：90～95％のものが多い. しかも, その転換効率